BC STATS
Province of British Columbia
Ministry of Finance and Corporate Relations

Infoline

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Report Measurement Bias in the Consumer Price Index

BC at a glance . . .

POPULATION (thousands)	Oct 1/96	% change on year ago
BC	3,888.5	2.5
Canada	30,101.6	1.2
GROSS DOMESTIC PRODUCT		% change
(BC - at market prices - $ millions)	1995	on year ago
Current Dollars	103,273	4.6
Constant (1986) Dollars	74,107	1.9
TRADE ($ millions)		
Manufacturing Shipments (seas. adj.) Nov	2,795	-0.7
Merchandise Exports (raw) Nov	1,976	-3.6
Retail Sales (seasonally adjusted) Nov	2,678	4.6
CONSUMER PRICE INDEX		% change
(all items - 1986=100)	Dec '96	on year ago
BC	138.7	0.7
Canada	136.8	2.2
LABOUR FORCE (thousands)		% change
(seasonally adjusted)	Jan '97	on year ago
Labour Force - BC	2,002	2.0
Employed - BC	1,841	3.2
Unemployed - BC	161	-9.7
		Jan '96
Unemployment Rate - BC *(percent)*	8.0	9.1
Unemployment Rate - Canada *(percent)*	9.7	9.6
INTEREST RATES (percent)	Feb 12/97	Feb 14/96
Prime Business Rate	4.75	7.00
Conventional Mortgages - 1 year	5.20	6.50
- 5 year	7.25	7.80
US/CANADA EXCHANGE RATE	Feb 12/97	Feb 14/96
(avg. noon spot rate) Cdn $	1.3554	1.3787
US $ *(reciprocal of above rate)*	0.7378	0.7253
AVERAGE WEEKLY EARNINGS		% change
(industrial aggregate - dollars)	Nov '96	on year ago
BC	617.74	3.2
Canada	595.39	3.3

SOURCES:
Gross Domestic Product: Statistics Canada, revised by BC STATS
Population, Trade, Prices, Labour Force, Earnings: Statistics Canada
Interest Rates, Exchange Rates: Bank of Canada Weekly Review

New Publication

(Repeat from last week. Thank-you for your interest. See ordering information below.)

Just released is *A Guide to the BC Economy and Labour Market*, authored by Lillian Hallin of BC STATS. This 80-page book provides basic information on the industrial building blocks of BC's economy and the characteristics of employment in these, including projected job growth. It details provincial industries with an emphasis on their human resource side. Economic terms are explained and examples provided, so that a background in economics is not necessary. The book also provides a perspective on where the province has come from historically. This is to help provide a context for where BC's industries are at in the mid-1990s and where they are expected to be going into the next century. We will gladly mail copies for a shipping and handling charge of $5 per copy (plus GST). Sorry, no invoices at this price. But we do take VISA and Mastercard.

Please place orders through Kris Ovens:

tel (250) 387-0359
fax (250) 387-0380

Released this week by BC STATS

- Tourism Room Revenue, October 1996

Next week

- Exports (BC Origin), November 1996
- Earnings and Employment Trends, November 1996
- Consumer Price Index, January 1997

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Infoline Report:
February 14, 1997

Measurement Biases in the Consumer Price Index

Reprinted from the December 1996 Issue of *Consumer Price Index*. An annual subscription is $60 + GST.

Introduction

In the past two years there has been extensive study and public debate in the United States on the topic of upward bias in the Consumer Price Index (CPI) as a measure of change in the cost of living and the impacts that such a bias would have on the deficit. Following statements made by Alan Greenspan, chairman of the Federal Reserve Board, in January 1995 to the Budget Committees of Congress, an advisory commission, chaired by Michael Boskin, was set up to study the CPI. The commission has recently presented its final report, entitled "Toward a More Accurate Measure of the Cost of Living"[1] to the Senate Finance Committee. The report concludes that the U.S. CPI will overstate changes in the true cost of living and that the "best estimate of the size of the upward bias looking forward is 1.1 percentage points per year. The range of plausible values is 0.8 to 1.6 percentage points per year." This note discusses the different types of biases that exist in the CPI and also presents the results from a similar study on the Canadian CPI.

The Effects of Measurement Biases

At first glance it might seem strange that so much attention has been focused on a statistical series, albeit an important one. However, if one considers the many uses of the CPI, especially in terms of indexation and its impacts, then it is not so surprising. In both Canada and the United States there is widespread use of indexation: income tax brackets, pensions, contracts, and so on. It would appear that in Canada the practice of partial indexation rather than full indexation may be more common than in the United States. One can point to examples such as the Canadian personal income tax system where tax brackets and certain tax credits are increased by the amount by which the annual change in the CPI exceeds 3%. The rationale for this type of partial indexation is not related to any type of bias in the CPI, but rather to the idea that only when price changes are relatively strong are the effects of inflation considered to present a hardship. In fact for tax years subsequent to 1992 no indexation has been required as the increase in the CPI has been less than 3%.

In the United States, around one third of federal spending, mostly in retirement programmes, is directly indexed to the CPI. Federal revenues are also affected through the indexing of income tax brackets. Any upward bias in the CPI would have the effect of increasing the deficit from both perspectives. The Congressional Budget Office "estimates that if the change in the CPI overstated the change in the cost of living by an average of 1.1 percentage points per year over the next decade, this bias would contribute about $148 billion to the deficit in 2006 and $691 billion to the national debt by then."[2]

Upward biases in the CPI would also have an impact on some of the main aggregate measures of economic activity, in particular real growth and productivity. Real GDP growth would be reduced since many of the CPI component indexes are used to deflate the components of personal expenditure. Other price indexes, which are used for deflating components of GDP, may suffer from similar biases to those in the CPI.

[1] "Toward a More Accurate Measure of the Cost of Living", Final Report to the Senate Finance Committee from the Advisory Commission To Study the Consumer Price Index, December 4, 1996.

[2] Ibid.

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Types of Bias

As a measure of change in the cost of living, the CPI contains a number of biases, which stem from the definition and the methodology used to construct the CPI. There are four types of bias which contribute to the overall overstatement of the cost of living.

The CPI, as produced by Statistics Canada in this country and by the Bureau of Labor Statistics in the United States, does not directly measure changes in the cost of living but rather changes in the cost of purchasing a fixed basket of goods and services. However, a true cost of living index would measure changes in the minimum cost of attaining a fixed standard of living. As relative prices change, a cost of living index would measure the price of goods that consumers purchase as they substitute away from relatively more expensive items to relatively less expensive items. By holding the composition of the basket of goods and services fixed, the CPI will overstate increases in the cost of living. The size of this bias is referred to as **commodity substitution bias**.

There are also changes over time in where consumers make their purchases. In recent years there has been strong growth in superstores and discount stores, offering lower prices relative to traditional retail outlets. If the outlets sampled in the production of the CPI are not representative of where consumers are currently making purchases, then there will be **outlet substitution bias** in the CPI. However, not all of the difference in an item's price between a discount store and a regular store can be attributed to outlet substitution bias. The consumer may be purchasing an item of different quality in the two outlets, if the regular outlet offers a higher level of service or a more convenient location. A discussion of this type of bias follows.

The fixed basket of goods and services, which is used in producing the CPI, is also intended to be fixed in terms of its quality. However, over time improvements are made to products, both in terms of new features, increased performance, reduced frequency of repair, etc. and the observed change in price should be adjusted to remove the effects of the change in quality. In calculating the CPI, adjustments for changes in quality are made for many items, especially consumer durables. If these adjustments underestimate or miss changes in quality there will be positive **quality bias** in the CPI.

As new products, such as microwaves and compact disc players, are introduced into the market, they typically only enter the CPI basket with a lag. To the extent that new goods and services are missing from the CPI and their rates of price change are different than the prices of items included in the basket, a **new goods bias** is introduced.

Estimates of Bias for Canada and the United States

The following table presents estimates of the four types of biases for Canada, as reported by Allan Crawford in a 1993 Bank of Canada study[3], and for the United States, as reported by the Advisory Committee. Note that the American report presents the average bias, while the Canadian study reports the upper limit for each type of bias. In the United States the total upward bias in the

[3] Crawford, Allan, "Measurement Biases in the Canadian CPI: A Summary of Evidence", Bank of Canada Review, Summer 1993 and reprinted in The Consumer Price Index, Statistics Canada, Cat. No. 62-001, December 1993.

CPI is estimated to be 1.1 percentage points per year, with a lower limit of 0.8 and an upper limit of 1.6. The upper limit of the upward bias in the Canadian CPI is estimated to be much lower in Canada at 0.5 percentage points.

Estimated Bias in the Consumer Price Index
(percentage points per year)

Type of Bias	United States	Canada (upper limit)
Commodity Substitution	0.4	0.2
Outlet Substitution	0.1	0.1
Quality	0.6	0.2
New Goods		0.1
Total	1.1	0.5
Range	0.8-1.6	

Source: Advisory Committee to Study the U.S. CPI
Crawford, Allan, "Measurement Biases in the Canadian CPI

The estimate for the upper limit of bias in the Canadian CPI is roughly one third of the upper limit for the U.S. CPI. Despite the fact that the estimates of bias have been produced by different people, there are reasons to believe that the biases in the Canadian CPI could be lower than those in the U.S. CPI. In Canada the basket is updated more frequently, normally every four years. The weights based on the 1992 Family Expenditures Survey were introduced into the CPI in January 1995. In the United States the weights are updated every 10 or 11 years, with the basket based on 1982-84 expenditures being introduced in January 1987, and the basket based on 1993-95 expenditures scheduled to be introduced in January 1998. The further away one is from the period to which the basket applies, the greater are the chances for commodity substitution bias and potentially for some of the other types of bias.

In the case of the Canadian CPI, Statistics Canada introduces new goods into the CPI between regular basket updates when warranted by market information. For example, microwaves were added to the CPI in June 1983, in advance of the regular basket revision in January 1985 and compact disc players were added in September 1990, following the basket update of January 1989. The introduction of new goods into the U.S. CPI is likely to be somewhat slower. New goods can enter the CPI between basket changes through the one-fifth of the sample which is replaced through rotation each year.

Conclusion

In the Canadian context it thus appears that the magnitude of the upward bias in the CPI relative to changes in the cost of living is considerably lower than in the United States. The impact of the bias in the CPI on the Canadian deficit and debt is probably also muted by the greater use of partial indexation in this country. However, given the widespread use of the CPI in producing other aggregate statistics, it is important to consider the possible effects of bias in the CPI when using measures of real economic growth, productivity, low income cut-offs and other indicators which incorporate information from the CPI.

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highlights

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a weekly digest of recently released British Columbia statistics

Tourism

- Accommodation room revenues in BC declined 1.1% (seasonally adjusted) in October. This was the fifth consecutive month in which room revenues have fallen. October's decline was mainly due to a 1.4% decrease in room revenues in the Mainland/ Southwest development region. Revenues inched up 0.2% in the Vancouver Island/Coast and Cariboo regions. Both the Ne-chako (+9.6%) and Northeast (+7.7%) regions recorded strong gains, with more moderate growth in Thompson-Okanagan (+2.4%), Kootenay (+2.4%) and the North Coast (+1.4%).
  Source: BC Stats

- Hotel revenues fell 3.1% (seasonally adjusted) in October, as revenues in large (250+ rooms) hotels dropped 4.2%. Large hotels account for 40% of total hotel revenue, and about a third of total room revenues in the province. Among other accommodation types, motel revenues edged up 0.3% and revenues for vacation rentals were 2.2% higher than in September, but revenues at fishing lodges were down 10.1% from the previous month.
  Source: BC Stats

- A fifth (1.8 million) of the 9.2 million travellers flying into Canada from the US last year cleared customs at Vancouver International Airport, making the airport the second-busiest for international travellers in the country. Toronto's Pearson Airport (4.1 million person-trips) accounted for 45% of the total.

- The number of international travellers entering the country via Vancouver last year was up 23.1% from 1995. This growth was the strongest among major airports, and well above the national average (14.4%). *Source: Statistics Canada*

Business and Economics

- New motor vehicle sales in the province declined for the second consecutive year in 1996. Sales were down 3.0%, largely due to a 6.5% drop in the number of new cars sold in BC. Purchases of trucks and commercial vehicles inched up 0.7%. A major factor in last year's declining sales was a weak market for vehicles manufactured overseas. Sales of overseas-made vehicles have been falling since 1990, as foreign-owned car companies are manufacturing more vehicles in North America. Since 1990, sales of overseas-manufactured vehicles in BC have fallen 70%, and the average cost of these vehicles has risen 79%.

- Newfoundland (-5.3%) and Prince Edward Island (-2.4%) were the only other provinces where new vehicle sales in 1996 fell below the 1995 level. Canadian vehicle sales recovered from a poor performance in 1995, with total sales rising 3.3%. The strongest gains were in the three prairie provinces, as sales rose 16.0% in Saskatchewan, 15.9% in Manitoba, and 9.4% in Alberta. *Source: Statistics Canada*

- While British Columbians bought fewer cars and trucks in 1996, they paid more for their vehicles than in the previous year. The average price per vehicle sold in BC in 1996 was $28,059, an increase of 9.7% relative to the previous year. Alberta ($28,755) and Saskatchewan ($28,252) were the only provinces where consumers paid more, on average, for their new vehicles. The national average price was $26,139, or 8.2% more than in 1995. *Source: Statistics Canada*

Housing Market

- The cost of new housing in BC's two largest cities continued to decline in December. The new housing price index (nhpi) for Victoria was 5.1% lower than in December 1995, while Vancouver's nhpi dropped 4.9%. The Canadian nhpi was down 0.9% over the same period. Vancouver, Victoria, and Quebec City (-2.1%) were the only centres where new house prices fell significantly during the twelve months ending last December.

- On an annual basis, the NHPI for both Vancouver and Victoria fell for the third consecutive year. Victoria's 7.1% decline brings the total drop in new

For data originating from Statistics Canada: data sourced to 'Statistics Canada' has been retrieved from CANSIM, the agency's electronic database; otherwise the source is identified as 'SC' plus the publication name or catalogue number.

Did you know...?
In 1995, two in three reported incidents of prostitution in Canada originated in the Toronto, Montreal and Vancouver areas. Vancouver (66 incidents per 100,000 population) had the second highest rate in Canada, after Regina (107).

house prices since 1994 to 15.8%. In Vancouver, the NHPI was down 6.0% from 1995, and 11.4% lower than in 1993. Canada's NHPI declined for the second straight year, falling 2.0% between 1995 and 1996. *Source: Statistics Canada*

- Housing starts in British Columbia declined sharply in January, falling 21.2% (seasonally adjusted). The decrease was attributed to the effects of a severe winter snowstorm in the southwestern part of the province. February's figures are expected to be stronger. In urban BC, housing starts were down 29.4%, as multiple-unit starts plunged to 31.8% below the December level. Starts on single-family homes decreased by a more moderate 6.5%. Multiple- and single-unit starts in the Vancouver area were down 7.9%. Nationally, the number of housing starts rose 7.8% in January, to their highest level since November 1994. Ontario (-0.6%) was the only other region where housing starts fell below the December level. Starts were up 27.4% in the Prairies, and 98.7% in Atlantic Canada.
Source: Canada Mortgage and Housing Corporation

- Sales of existing homes through the Multiple Listings Service (MLS) in BC increased 24.3% during 1996. Last year, 72,182 homes in the province changed hands, up from 58,082 in the previous year. MLS residential sales were brisk during 1996, increasing in all regions of the country except the Yukon (-22.9%). Nationally, sales were up 27.2%, with the largest gains recorded in PEI (+57.6%), the Northwest Territories (+34.0%) and Ontario (+31.3%). The smallest gain was in Manitoba, where sales were up 12.5% from 1995.

- The improvement in MLS sales across the country was stimulated by lower interest rates and rising consumer confidence in the economy. Bolstered by a booming market, house prices in Canada rose 0.5% in 1996, to an average of $151,071. BC continued to have the most expensive homes in the country (with an average price of $218,687), but house prices, dropped slightly (-1.4%) in 1996. NWT was the only other region where house prices fell (-3.3%, to $158,300) last year.Source: Canadian Real Estate Association

Social Trends

- Sales of beer, wine and spirits by the province's Liquor Distribution Branch (LDB) were down 0.2% in 1996. The decrease was mainly due to a 1.0% decline in beer sales. Wine sales were up (+1.3%), and sales of coolers (+8.9%) and cider (+7.2%) also increased. Beer and wine sales from the LDB have been affected by U-Brews which are used by a growing number of people.
Source: Liquor Distribution Branch

- During the three-month period from July to September, one new AIDS case was reported in the province, bringing the total number of AIDS cases reported since 1983 to 2,319. During this period, 1,799 British Columbians have died of the disease. The increase in the number of AIDS cases slowed considerably during 1996. In the first nine months of last year, 46 new AIDS cases were reported, compared to 210 cases during all of 1995.
Source: BC Centre for Disease Control

- Between 1991 and 1995, 63 known prostitutes in Canada were murdered. Almost all (60) of them were female, and 7 were juveniles between the ages of 15 and 17. Fifty of the prostitutes were thought to have been killed by clients, and 8 were murdered by pimps or in a drug-related incident. In 1995, 6,710 Canadians were charged with communicating for the purposes of prostitution. Almost all (97%) of them were adults; youths were more likely to be referred to social agencies. Fifty-five percent of those charged were female, and 45% were male. Adult women (39%) were more likely to be sentenced to prison than men (3%). Among adult men, 56% of those charged with communicating were fined, while 32% of women charged with the same crime received a fine.
Source: SC, Juristat Vol 17 #2

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